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## Albert Baldwin Wood, the Screw Pump, and the Modernization of New Orleans

Nicole Romagossa

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Albert Baldwin Wood, the Screw Pump, and the Modernization of New Orleans

A Thesis

Submitted to the Graduate Faculty of the  
University of New Orleans  
in partial fulfillment of the  
requirements for the degree of

Master of Arts  
in  
History  
Public History

by

Nicole Romagossa

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## Abstract

Albert Baldwin Wood and his screw pumps modernized New Orleans by bringing flood-free streets and cleaner water to the city while providing the potential for growth by pumping swamp lands dry. While Wood was never part of the local Progressive movement, his work with the pumps fit with Progressive initiatives for modernization. At first, the screw pumps removed rain water from the streets. Then New Orleans expanded the drainage to include sewerage removal and water purification. The pumps successfully drained thousands of acres of land once considered uninhabitable swamp land. This additional land extended New Orleans city limits but also aided in the acceleration of residential segregation. Cities from around the world used the designs for the screw pump and consulted Wood for advice on drainage systems.

Keywords: Albert Baldwin Wood, screw pump, New Orleans, Progressivism, modernization, yellow fever, residential segregation.

It is rare that a man becomes almost a legendary figure during his own lifetime. Baldwin (sic) Wood was such a man. In a very real sense, he is one of the fathers of modern New Orleans.  
-New Orleans *States*, May 11, 1956.<sup>1</sup>

On August 29, 2005, Hurricane Katrina made landfall in Louisiana. The failure of federal levees to protect the city caused catastrophic damage to New Orleans. But, when everything else in the city seemed to be failing, pumps designed by Albert Baldwin Wood in 1913, did not falter. Wood's screw pumps, housed at Pump Station Number 1, kept pumping throughout and even after the storm. Pump Station Number 1 contained six pumps using Wood's patented design—two originally built in 1913, two built in 1928 and two built in the 1990s. According to an interview conducted by the *New York Times* with Kevin Martin, a pump operator who manned the pumps during Hurricane Katrina, the newer pumps are the most powerful but ironically those pumps were the first to fail during the storm. Martin said, "The original two pumps, those are the most reliable. I'd use those two before I'd use any of the others."<sup>2</sup>

During the 1910s and 1920s, the reliability and efficiency of Wood's screw pump helped transform New Orleans into a modern city. Once stalled from the ravages of the Civil War and the yellow fever epidemics that followed, New Orleans was brought into the twentieth century as a far more progressive and livable city due to the screw pump. Wood's screw pumps helped New Orleans drainage emerge as the world's most advanced drainage system. Cities across the country and countries across the world saw Wood's pumps as the future of modern drainage systems. Wood's inventions went even further to provide clean water and waste removal to the city's residents.

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<sup>1</sup> William Madden, "Death of Wood 'Loss for N.O.,'" *States*, May 11, 1956.

<sup>2</sup> Nicolai Ouroussoff, "How the City Sank," *New York Times*, October 9, 2005, <http://www.nytimes.com/2005/10/09/arts/design/09ouro.html> (accessed September 6, 2009).

Embodying the essence of Southern Progressivism, Wood applied his engineering expertise into developing the screw pump that effectively solved the drainage problem experienced by New Orleans residents. The efficiency of the pumps drained water so fast that thousands of acres of marsh and swamp land expanded the city limits, facilitating the creation of new suburbs. However, with these new suburbs, and their covenants, also came more codified segregated housing practices in the city.

While the Sewerage and Water Board had mild success in drainage within the first few years of the twentieth century, the story of the modernization of New Orleans cannot be told without recognizing Albert Baldwin Wood and his invention of the screw pump. Wood's screw pump brought modernity to New Orleans by creating flood-free streets, cleaner water, and new neighborhood developments, all which improved the quality of life for New Orleans residents and transformed New Orleans into the global leader of drainage.

### **Postbellum New Orleans**

As the Civil War closed, New Orleans' economy was left in shambles. The production of Confederate money halted and Confederate currency loaned out prior to the Civil War became invalid. Despite the unstable economy, white southerners refused to look to the North for help. In 1868, when Henry Clay Warmoth took the governorship of Louisiana during Republican Reconstruction, he pledged to improve the city's infrastructure. However, white southerners feared that the Republicans' goal of a biracial government would tip the balance of power to newly freed blacks. The obsession with race relations propelled southern business leaders to prevent any "Yankee" improvements and the leaders succeeded, at the cost of the state's infrastructure and progress.

While other former Confederate states welcomed northern input, Louisiana's southern leaders blocked all initiatives. For example, Louisiana's leaders prevented any real progress to be made in the completion of the railway system. As the North and West began to modernize, these regions began laying down railroads, which eventually became the preferred method to ship goods to inland parts of the country, replacing the Mississippi River. Historically, the Mississippi River was the essential feature that attracted early settlers to New Orleans. The port's location allowed for trade, shipment, and access both to domestic and international destinations. The appeal of transporting goods to places reached and unreached by the Mississippi River heightened the importance of the railroad and stripped the Mississippi River of its duty.

Prior to the Civil War, Louisiana and New Orleans residents tried to create a railway system and invested money into a railroad company. However, after the war, no money was available to continue to invest and construction ceased. The Reconstruction government, led by Northerners, required Louisiana and New Orleans stockholders to sell stock owned in the company to Colonel Henry McComb. New Orleans conservatives refused to sell even though McComb's railroad company had successfully installed railroad systems in both Tennessee and Mississippi.<sup>3</sup> While New Orleans refused Northern help, Atlanta businessmen welcomed the opportunity to modernize with Northern investments. Because of this, all five of Georgia's railroads were in working order only one year after Confederate occupancy ended.<sup>4</sup> In comparison, ten years after the Civil War, Louisiana had only 539 miles of functioning railroad tracks, in which only 200 miles had been added since the war.<sup>5</sup>

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<sup>3</sup> Michael A. Ross, "Resisting the New South: Commercial Crisis and Decline in New Orleans, 1865-85," *American Nineteenth Century History* 4, no. 1 (2003): 65.

<sup>4</sup> Ross, "Resisting the New South," 66.

<sup>5</sup> Ross, "Resisting the New South," 66.



When New Orleanians finally decided the city needed Northern investments, New Orleans modeled its campaign after the Atlanta's Cotton Exposition of 1881. Georgia used the Cotton Exposition as a medium to show America that Atlanta was ready to move on with help from the government. The event was a success and Atlanta's newspapers praised the city for its progressive stance and investors felt safe putting money into Georgia's rebuilding efforts. New Orleans assumed its Cotton Exposition of 1884 would have the same affect. Organizers advertised that the New Orleans Cotton Exposition was to celebrate the 100<sup>th</sup> anniversary of the first cotton shipment from Europe to the United States.<sup>6</sup> In reality, New Orleans wanted to prove that the city was on the path to becoming an economic competitor in America. However, New Orleans did not live up to the hype created for the Cotton Exposition mainly because the city did not have the financial backing to pay for such an elaborate exposition. Some of the buildings designed specifically for the event were not even finished in time to be used. Even with the small visitor turnout, the limited amount of transportation had to work overtime to cart around visitors, which did not help cast New Orleans in a progressive light. The exposition was unsuccessful and reaffirmed Louisiana as a backward state unable to measure up against other New South states.

### **New Orleans, Yellow Fever, and the Rise of Progressive Ideals**

The dismal visitor turnout to the New Orleans Cotton Exposition could be linked to the yellow fever epidemics that began mid-1800s and recurred into the early twentieth century. According to historian Benjamin H. Trask, the 1878 yellow fever epidemic, the nation's largest outbreak, started in New Orleans.<sup>7</sup> The nation and the media turned to highlight the sanitation problems that plagued New Orleans, thus, linking the yellow fever epidemics to unsanitary living

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<sup>6</sup> Ross, "Resisting the New South," 71.

<sup>7</sup> Benjamin H. Trask, *Fearful Ravages: Yellow Fever in New Orleans, 1796-1905* (University of Louisiana at Lafayette: Center for Louisiana Studies, 2005), 124.

conditions and dissuading people from visiting New Orleans. The Board of Experts assigned by Congress to examine the 1878 outbreak angrily voiced their opinions in regards to the city sanitation

Insanitary situations or modes of living deteriorate human health and strength, and thus diminish the power of resisting the invasion of disease. It therefore follows that the most perfect local sanitary conditions attainable should be established and uniformly maintained in our cities and towns and their surroundings. Filth should not be allowed to accumulate, nor should the sanitary reform be deferred until yellow fever has made its appearance.<sup>8</sup>

The yellow fever epidemics did more than just stifle tourism; the epidemics uncovered New Orleans' sanitation problems. In June 1879, a Sanitary Association meeting was held to discuss the sewerage situation in New Orleans. Dr. Joseph Holt, who later became president of the Louisiana State Board of Health from 1884-1888, described the poor living conditions of some New Orleanians. Recorded by the *Daily Picayune*, Holt explained "the miseries of the many poor in the city are largely the consequence of their abject surroundings with crowded and wretched [illg], filthy gutters reeking with putrefaction, dirty cisterns, [illg] of cesspools traveling their yards, etc."<sup>9</sup> Holt used this opportunity to introduce his plan of action to improve sanitation in New Orleans. According to Holt, New Orleans could be cleaned by flushing the city with a deluge of water that would wash away the filth.<sup>10</sup> While Holt's plan never materialized, New Orleans began to see that something needed to be done with the city's water works and (lack of) drainage.

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<sup>8</sup> "Contagious Disease: Report of the Yellow Fever Commission. Causes and Extent of the Epidemic—How the Disease is Transmitted Through Trade Channels—Means of Prevention and Care—New System of Quarantine Recommended," *Daily Picayune*, February 4, 1879.

<sup>9</sup> "City Sanitation: The Meeting at St. Patrick's Hall—Importance of Improving the Sanitary Condition of the City as Set Forth by Several Speeches—Plans Discussed and Suggestions Made," *Daily Picayune*, June 4, 1879.

<sup>10</sup> "City Sanitation: The Meeting at St. Patrick's Hall," *Daily Picayune*, June 4, 1879.

By the end of the nineteenth century, Progressivism had infiltrated into rural and urban landscapes of America. The Progressive movement aimed "...to improve, the conditions of life and labor and to create as much social stability as possible."<sup>11</sup> Progressivism in Louisiana directly impacted the construction of public utilities in New Orleans. According to historian Robert L. Dupont, the tri-system of sewerage, water, and drainage "...embodied the principles of southern urban progressivism: limitations on direct democratic input, the use of experts, and the assumption that a public interest could be defined and served."<sup>12</sup>

The effectiveness of governmental strategies to combat yellow fever demonstrated to residents that the government could identify public interest and devise a way to fix the problem. In this case, Progressives identified a need for improvement back in the late 1880s when yellow fever swept over Louisiana. From the acknowledgement of yellow fever, officials uncovered the root of the problem as lying with the poor sanitation of the city. Government officials relied on Dr. Joseph Holt to create a quarantine system to prevent yellow fever from entering through the New Orleans port. While the quarantine system proved successful, the problem of sanitation had yet to be thoroughly addressed. Sure the Sewerage and Water Board made baby steps in the beginning to secure drainage, but, without a cohesive plan and sufficient funds, the plan failed to address the drainage problem of the city.

The city's drinking water came directly from the Mississippi River; unfiltered, unpurified, and unsanitary. The Mississippi River also became the method by which New Orleans rid the city of garbage. Residents stored garbage in crates then dumped the crates into the Mississippi River with the idea that the Mississippi River's strong current would remove the

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<sup>11</sup> Arthur S. Link and Richard L. McCormick. *Progressivism*, Illinois: Harlan Davison, Inc. 1983, 2.

<sup>12</sup> Robert L. Dupont, "Progress, Civil Development and Political Conflict: Regular Democrats and Reformers in the New Orleans, 1896-1912" Volume 1 UMI Dissertation Services: Michigan 2000, 218.

waste out of the city; an out of sight out of mind solution to the problem.<sup>13</sup> Growing up young Wood and his family probably participated in these same methods considering these practices were the norm at the time. Wood's experience during yellow fever and observations of these practices would be called upon later in his career. In 1914, Mayor Martin Behrman took a retrospective look at the Mississippi River use during that time and concluded that the unsanitary practices of pumping the water directly from the river without filtration "render it wholly unfit for use for cooking, bathing, or for nearly any other domestic purpose."<sup>14</sup>

Matching with Progressive ideals, New Orleans health officials started to study other cities' improvements to sanitation problems. For instance, health officials partitioned the New York City into fifty districts and a commissioner was assigned to each district to supervise the sanitation practices of that district.<sup>15</sup> New York City targeted overcrowding in tenements as a measure to prevent the spread of disease and improve living conditions. Commissioners drew diagrams denoting the number of residents per tenement.<sup>16</sup> From these diagrams, health commissioners, under extreme conditions, could prompt the tenement owners to improve the airflow or lower the number of residents.<sup>17</sup>

Like New York, New Orleans officials focused on improving healthy practices devised to put an end to the yellow fever's association with New Orleans in hopes of improving the quality of life in the city. Holt designed a quarantine rating classification ranging from one to four to be used at New Orleans ports. Even a high rating of four required a vessel to undergo cleaning for

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<sup>13</sup> Robert W. Williams, Jr., "Martin Behrman and New Orleans Civic Development, 1904-1920," *Louisiana History: The Journal of the Louisiana Historical Association* 2, no. 4 (1961): 393-394.

<sup>14</sup> Martin Behrman, "New Orleans: A History of Three Great Public Utilities Sewerage, Water and Drainage and their influence upon the Health and Progress of a Big City," September 29, 1914, 3. (Paper read before convention of League of American Municipalities, Milwaukee, WI. Tulane Special Collections, Tulane University, New Orleans, LA.).

<sup>15</sup> "City Sanitation Elsewhere," *Daily Picayune*, July 19, 1879.

<sup>16</sup> "City Sanitation Elsewhere," *Daily Picayune*, July 19, 1879.

<sup>17</sup> "City Sanitation Elsewhere," *Daily Picayune*, July 19, 1879.

five days and six hours.<sup>18</sup> Clothing and such required steam cleaning, whereas fruit and food products were first removed and then the vessel cleaned. By the 1890s, the seriousness of yellow fever epidemics forced health officials to also decontaminate trains, from which yellow fever could be transferred all around the country.

The repeated yellow fever outbreaks further tarnished New Orleans' image. The unsanitary conditions around the city did not help the situation, but these conditions were not the *only* cause. Yellow fever was abundant in New Orleans because of the hot, humid, and tropical-like weather favored by the mosquitoes. At the time, few Americans realized that yellow fever spread through the *Aedes aegypti* mosquito.<sup>19</sup> The combination of the weather and standing water, which attributed to the population growth of the mosquitoes, led to New Orleans being most affected by the fever. According to historian Margaret Humphreys, New Orleans faced yellow fever mortalities *every* year between 1840 and 1905 and nine of those years yellow fever deaths spiked to ten percent.<sup>20</sup>

At the end of the nineteenth century, New Orleans residents did not rely exclusively on the city to supply water. Instead, eighty-two percent of the city's households used wood cisterns made of cypress to catch rainwater from the sky and off rooftops.<sup>21</sup> The wood cisterns remained uncovered allowing dirt to collect in them. More importantly, the standing water in the cisterns became breeding grounds for mosquitoes. While the city did have some canals, the canals left water standing and did not properly drain the water from the city. As for a drainage system, New

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<sup>18</sup> Trask, *Fearful Ravages*, 97.

<sup>19</sup> For further detail about the carrier of yellow fever, please see Chapter 10 "Theory and Controversy: Origin, Causation, and Transmission of Yellow Fever" in Jo Ann Carrigan's, *The Saffron Scourge: A History of Yellow Fever in Louisiana, 1796-1905*, (University of Southwestern Louisiana: The Center for Louisiana Studies, 1994).

<sup>20</sup> Margaret Humphreys, *Yellow Fever and the South* (New Brunswick: Rutgers University Press, 1992), 3.

<sup>21</sup> Williams, Jr., "Martin Behrman and New Orleans Civic Development," 374.

Orleans only had three wooden drainage wheels operated by steam that rotated backwards to push water out of the city.<sup>22</sup>

In 1905, the last yellow fever outbreak occurred in New Orleans. Dr. Quitman Kohnke and Joseph H. White urged New Orleans residents to screen off open living areas and cover the cisterns to prevent mosquitoes from harboring in the standing water. For residents who could not screen the cisterns, oil was poured in to prevent mosquito larvae from breathing. When people finally embraced the idea that mosquitoes transmitted yellow fever, the unhealthy environment of the city did not help New Orleans remove its association as being the source of the yellow fever outbreaks.<sup>23</sup>

### **Early 1900 Drainage**

In 1893, New Orleans officials agreed that the city needed a cohesive drainage system. The “improvements” made in the past to New Orleans drainage had only acted as patches in the overall drainage of the city. Therefore, the Acts of Legislature of 1890 allocated \$17,500 for the use of public improvements. Section 10 of Article 110 read “any material improvements of the city that are now instituted, should no longer be temporary expedients, but based upon well digested plans designed to provide for all future contingencies...”<sup>24</sup> While \$17,500 would not go far in implementing a city-wide drainage system, city officials began to understand the need for a comprehensive drainage system and began a serious inquiry into the matter. In fact, the New Orleans Levee Board sponsored a contest encouraging residents to submit drainage plans for the city.<sup>25</sup> Because none of the plans submitted accounted for New Orleans’ unusual geography, no

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<sup>22</sup> Behrman, “New Orleans: A History of Three Great Public Utilities,” September 29, 1914, 2.

<sup>23</sup> Trask, *Fearful Ravages*, 109-110.

<sup>24</sup> Report on the Drainage of the City of New Orleans, By the Advisory Board, Appointed by Ordinance No. 8327, Adopted by the City Council, November 24, 1893. (New Orleans: T. Fitzwilliam & Co. 1895), 15.

<sup>25</sup> Report on the Drainage of the City of New Orleans, 50.

one won the contest (or the \$2,500 prize), but city officials realized a topographical survey needed to be completed on New Orleans to understand the city's distinctive topography. Once the survey was complete, city engineers could be called upon to establish a plan.

According to the Report on the Drainage of the City of New Orleans in 1893, the City Council adopted a plan of action for drainage. The objective of the plan included the "...removal of the rain water falling upon the inhabited and built-up part of the city..." and applied "to the removal of the ground water which at present saturates the soil, causing unsanitary conditions, besides preventing the usefulness of the territory..."<sup>26</sup> The plan called for New Orleans to be divided into six drainage sections: First, Second, Third, Fourth, Fifth, and Algiers. The six sections covered 42,932 acres of the city.<sup>27</sup> The First section was the largest, with the Algiers section being the smallest. The plan called for a main canal to run horizontally, intersecting the First through Fifth drainage sections. Because the Algiers district was located on the West Bank of the Mississippi River, the Algiers section had a main canal independent from the other districts. From the main canal, branch canals would veer off bringing water to a designated location, and the streets would have gutters to help alleviate the water. To push the water through the main and branch canals, the plan called for eight pumping stations: five "Main Stations" and three "Auxiliary Stations."<sup>28</sup>

The city decided to make the main canal's last stop Lake Borgne. Compared to Lake Pontchartrain, Lake Borgne was a less populated area with an open path to the Gulf of Mexico. Lake Borgne also experienced tide changes more frequently than Lake Pontchartrain, which in turn, moved the water out of the city faster. In comparison, Lake Pontchartrain's water level was several inches higher than Lake Borgne and did not have the advantage of being an open

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<sup>26</sup> Report on the Drainage of the City of New Orleans, 15.

<sup>27</sup> Report on the Drainage of the City of New Orleans, 25.

<sup>28</sup> Report on the Drainage of the City of New Orleans, 36.

waterway. Therefore, Lake Borgne became the preferred outlet whereas Lake Pontchartrain would only be used in cases of emergencies when a backup outlet was needed.<sup>29</sup>

The estimated cost of the completion of the entire project, which had a fifty year completion date, was estimated at \$7,933,691.<sup>30</sup> As mentioned earlier, only \$17,500 had been set aside for drainage. To address the funding gap, the plan was designed so that segments of the project could be completed over time. When funds grew scarce, small parts of the project could be completed and larger parts completed as more funding became available. The best solution to increase funds was to implement an additional tax, an idea hard for New Orleans residents to accept.

However, one segment of the population did support the measure—newly franchised women. While the women failed to receive enough votes for full suffrage, the 1898 state constitution was not a complete disappointment for women. Article 199 deemed taxpaying women as eligible to vote on taxation issues only: “Upon all questions submitted to the taxpayers...the qualifications of such taxpayers as voters shall be those of age [21 years or older] and residence prescribed by this article, and women taxpayers shall have the right to vote at all such elections...”<sup>31</sup>

The vote for the drainage tax was the first vote in which taxpaying women could participate. Kate Gordon, a leading Louisiana suffragist, created the Woman’s League for Sewerage and Drainage. The league went door to door collecting signatures to bring awareness of the issue to New Orleans residents and government. The league proved to be highly successful. Because of the substantial number of signatures gathered, the signatures prompted

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<sup>29</sup> Report on the Drainage of the City of New Orleans, 23-24.

<sup>30</sup> Report on the Drainage of the City of New Orleans, 43.

<sup>31</sup> Benjamin Wall Dart, *Constitutions of the State of Louisiana and Selected Federal Laws*. (Indianapolis: The Bobbs-Merrill Company Publishers, 1932), 638.



Mayor Walter C. Flower to order a ballot for the tax question.<sup>32</sup> On June 6, 1899, largely based on the support of women voters, New Orleans voted in favor of a two-mill tax for the next fifty years.

In 1895, four short years before Wood received his engineering degree, the Advisory Board of Engineers approved drainage plans by L. W. Brown to replace the inefficient drainage of New Orleans. In 1903, construction began on a new drainage system. Canals, pumps, and pumping stations were installed three years later.<sup>33</sup> The pumping stations could pump three times more efficiently and with four times the power of the old wooden drainage wheels.<sup>34</sup> Mayor Martin Behrman credited the new drainage to the decreasing death rate in New Orleans. Before 1900, the death rate was 27.2 deaths per every 1,000 residents but by 1913 the death rate decreased to 19.8 deaths per 1,000 residents.<sup>35</sup> Behrman praised the new drainage system in a 1914 speech to the League of American Municipalities in Milwaukee, Wisconsin, where he proclaimed that “no project ever brought to a successful issue in the history of New Orleans had so deep and wide an influence for good in all directions as that which ensued from this achievement.”<sup>36</sup> Behrman’s claim was premature.

While the designed drainage plan provided a good starting point for Louisiana, many faults came with the logistics and execution of the plan. The most significant flaw dealt with the inability to account for New Orleans’ growing population. According to the plans approved by the City Council, “even were it financially practicable, it is evidently unnecessary and unwise to do a large part of the desired work for a long time to come.”<sup>37</sup> Thanks to women suffragists, city

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<sup>32</sup> Susan B. Anthony and Ida Husted Harper, eds. *History of Woman Suffrage, 1883-1900*. (New York: Arno and The New York Times, 1969), 4:682-683.

<sup>33</sup> Behrman, “New Orleans: A History of Three Great Public Utilities,” 7.

<sup>34</sup> Behrman, “New Orleans: A History of Three Great Public Utilities,” 7.

<sup>35</sup> Behrman, “New Orleans: A History of Three Great Public Utilities,” 11.

<sup>36</sup> Behrman, “New Orleans: A History of Three Great Public Utilities,” 5.

<sup>37</sup> Report on the Drainage of the City of New Orleans, 31.

voters had secured the fifty-year tax for drainage, which answered the question of how the city would fund such a large project. However, to think that a timely completion of an interconnected drainage system would be “unnecessary” or “unwise” proved ill advised. While the city officials had no way of knowing the extent at which people would be moving away from rural life and into urban landscapes, population shifts at the time showed that population increase seemed inevitable. For example, in 1890, New Orleans was the largest city in the state with 242,039 residents. Within thirty years, the city grew drastically by over 100,000 residents.

For residents, drainage was a visible problem: either water was on the street or not. So, in the spring of 1907, when New Orleans received 8.57 inches of rain, residents became discontent when water sat on the street even after the installation of the new drainage system. The Sewerage and Water Board had no means of reassurance to offer the residents. However, even if the Board could explain, residents did not want answers and adopted the slogan “Drain, Not Explain”<sup>38</sup> The Board was unable to provide answers simply because the drains were not efficient enough to dispose of that amount of water quickly. The growing population combined with the inadequate drainage provided Wood with a ripe opportunity to make significant contributions to New Orleans drainage.

### **Wood and The Screw Pump**

Wood attended Tulane University, where in 1899, he graduated in the College of Technology in mechanical engineering. Wood’s academic achievements gained him a scholarship and the Glendy Burke Award in mathematics. While at Tulane University, Wood and classmate W. M. White delved into electronics by building a wireless set using only what the two had learned from reading the works of Guglielmo Marconi. The wireless set was capable of

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<sup>38</sup> Dupont, “Progress, Civil Development and Political Conflict,” 211.

sending and receiving communication from different classrooms at Tulane.<sup>39</sup> Although this invention would not bring him notoriety (nor was it created with that intent), the invention, unbeknownst to Wood, foreshadowed Wood's ability as an innovative thinker, a characteristic that would help Wood change New Orleans.

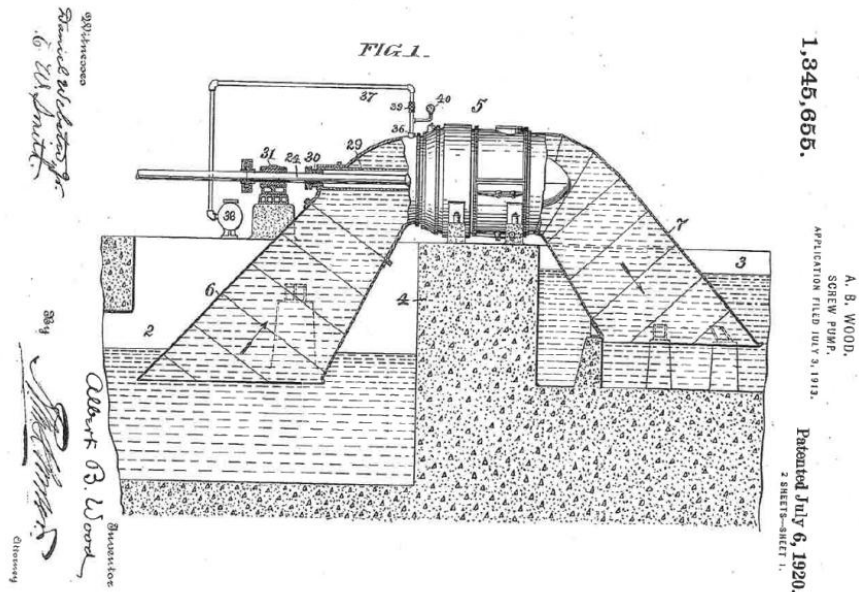
Immediately after his graduation, Wood was hired as assistant manager of drainage by the Drainage Commission of New Orleans, which evolved into the Sewerage and Water Board. The job required Wood to test each drainage system, none of which could run at the desired efficiency of sixty percent.<sup>40</sup> Knowing that he could do better, Wood created his own pump that he believed could surpass the efficiency of the current pumps. On July 3, 1913, Wood filed an application with the United States Patent Office for the Screw Pump. In the application, Wood stated: "the object of my invention is to provide a construction of screw pump adapted for impelling water in continuous manner, such as in sewerage and irrigation systems."<sup>41</sup> On July 6, 1920, Wood's invention received a patent and assigned patent number 1,345,655. (Figure 1 and 2).

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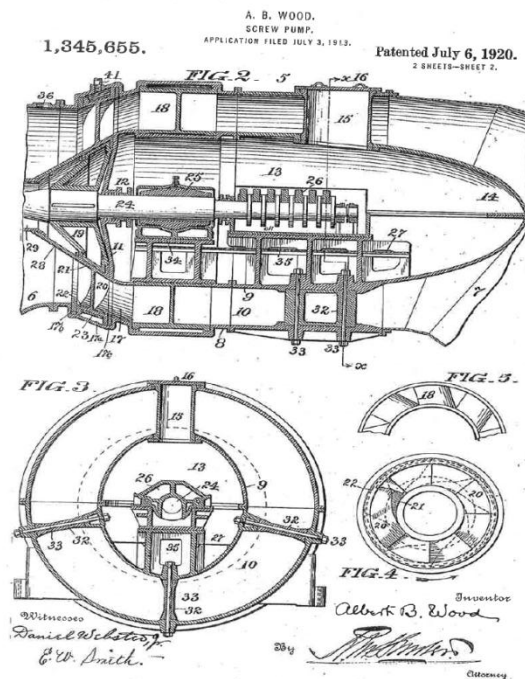
<sup>39</sup> The American Society of Mechanical Engineers, *A National Historic Mechanical Engineer Landmark: The A. B. Wood Low Head High Volume Screw Pump*. (Sewerage and Water Board of New Orleans, 1974), 8.

<sup>40</sup> Martin Behrman, "'Behrman Tells'" of Fight for and Success of Wood's Pumps: Part I," *New Orleans Item*, December 17, 1922.

<sup>41</sup> U.S. Patent and Trademark Office, Download U.S. Patents and more.  
<http://www.pat2pdf.org/patents/pat1345655.pdf>. (accessed September 2, 2009).



**Figure 1:** Patent and Trademark Office. <http://www.pat2pdf.org/patents/pat1345655.pdf> (accessed September 2, 2009) patent 1,346,655.



**Figure 2:** Patent and Trademark Office. <http://www.pat2pdf.org/patents/pat1345655.pdf> (accessed September 2, 2009) patent 1,346,655.

Wood's screw pump worked with the natural landscape of New Orleans. The land closest to the Mississippi River was higher than the land further away from the river. The more distance the land was from the river, the more below sea level the land sat. Therefore, water could not be moved in a linear direction because to drain areas below sea level the water must first be brought to sea level. A 1916 *Times-Picayune* article acknowledged this problem and stated "no other city has just such problems to meet. That is why no other city has such machinery as has been installed in several of the pumping stations, and as will be installed in all the others."<sup>42</sup> Wood's invention defied gravity by swiftly moving water up from below sea-level and away from the city. In his patent application, Wood proposed to have the pump "...operate properly when arranged at a considerable elevation above the normal level of water supply."<sup>43</sup> To achieve this, the screw pump relied on a vacuum pipe bringing the water up through the pump's rotating impeller to a canal, where the water flowed to the lake outlet.<sup>44</sup>

A typical pumping station included both screw pumps and vertical shaft pumps. The shaft pumps were installed prior to Wood's invention and at one time "...they were considered all that could be desired" from a pump.<sup>45</sup> Engineers inconveniently positioned the shaft pump to where any repairs would require a worker to descend into the depths of the pumping station to do any work. In contrast, the Wood pumps were placed to where a worker could use a platform built around the pump to make any necessary changes. The water entered the pumping station through a canal, and the pumps divided the water into two sections, which were then pumped out through

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<sup>42</sup> "Story of Great City Pump Stations. Titanic Machinery Handles Vast Flood of Water," *The Times-Picayune*, October 1, 1916.

<sup>43</sup> U.S. Patent and Trademark Office, Download U.S. Patents and more.  
<http://www.pat2pdf.org/patents/pat1345655.pdf>. (accessed September 2, 2009).

<sup>44</sup> U.S. Patent and Trademark Office, Download U.S. Patents and more.  
<http://www.pat2pdf.org/patents/pat1345655.pdf>. (accessed September 2, 2009).

<sup>45</sup> "Story of Great City Pump Stations." *The Times-Picayune*, October 1, 1916

the back to another canal located ten feet *higher* than the originally canal. The higher canal then carried the water to its destination in Lake Borgne.

By fall of 1913, the city called for bids to get the screw pumps constructed. *The Daily Picayune* made it apparent how extraordinary the pumps would be upon completion. The article announced that “the Sewerage and Water Board will commence on Friday to advertise for the manufacture of eleven of the most wonderful and effective pumps that have ever been constructed in any part of the world insofar as their pumping capacity.”<sup>46</sup> Each pump cost \$15,000 to produce and the plan called for eleven pumps.<sup>47</sup> By this time, the locations of all the districts and pumping stations had been set. The implementation of Wood’s invention worked within the already decided layout.

When Wood proposed his idea, he received both praise and opposition. Feeling the threat of Wood’s new pumps, local contractors suggested the pumps would fail. Edgar H. Farrar, a prominent New Orleans attorney, became the head of the opposition to the pumps. Farrar argued that “the [Sewerage and Water] board...is risking the money of the people of New Orleans in exploiting a pump PATENTED AND DESIGNED BY ONE OF ITS OWN ENGINEERS.”<sup>48</sup> New Orleanians were already attuned to the issue of new pumps considering New Orleans required residents to pay taxes for the pumps. In addition, widespread speculation of kickbacks going to Sewerage and Water Board members for the installation of the pumps also gave the pumps negative publicity.

The New Orleans city council also had reservations about the project. Of course the Sewerage and Water Board advocated for its own engineer, but the city council had little trust.

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<sup>46</sup> “New Pumps To Be World’s Biggest: Sewer and Water Board to Build Eleven of Record Capacity,” *The Daily Picayune*, November 6, 1913.

<sup>47</sup> “New Pumps To Be World’s Biggest,” *The Daily Picayune*, November 6, 1913.

<sup>48</sup> Martin Behrman, “Behrman Tells” of Fight for and Success of Wood’s Pumps: Part II,” *New Orleans Item*, December 18, 1922

After all, Wood worked on the screw pump invention unassigned and unpaid. Eventually, the city council changed positions and granted the Nordberg Manufacturing Company of Milwaukee a \$159,000 contract to install thirteen of Wood's screw pumps.<sup>49</sup>

Despite the opposition, by 1915, eleven pumping stations had been installed. The success of the screw pumps humbled Farrar. Farrar personally wrote a letter to Wood stating "'Nobody is more pleased than I am that the outcome of your pumps is entirely satisfactory.'"<sup>50</sup> In a *Times-Picayune* newspaper editorial, Mayor Behrman praised Wood's pumps for the ability of the pumps to run at seventy to eighty percent efficiency. Because of Wood and his pumps, by 1920, New Orleans had the most efficient, modern, and largest pumping system in the world.

Wood succeeded in finding a solution to the drainage because he actually understood the problem. *The Daily Picayune* praised Wood's knowledge of the landscape and that residents should "...give much credit to the young engineer from Tulane, who designed for this city a pump that would meet the need; as no man could have done who was not familiar with the problems that beset New Orleans."<sup>51</sup>

### **Sewerage Removal and Water Purification**

By 1925, the drainage district contained ten pumps. The main pumping station delivered 170,000,000 gallons per day, had a power capacity of 12,000 kilowatt and the low lift pumping had the capacity to pump 80,000,000 gallons per day.<sup>52</sup> To drain the city from excessive rainfall, the city relied on canal systems to bring the water to the pumping stations. Concrete canals ran

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<sup>49</sup> Sebastian Junger, "The Pumps of New Orleans," *Invention & Technology Magazine*. Reprinted in *Tulane Engineer*, Spring 2003. Tulane University, University Archive.

<sup>50</sup> Martin Behrman, "'Behrman Tells'" of Fight for and Success of Wood's Pumps: Part II," *New Orleans Item*, December 18, 1922

<sup>51</sup> "Story of Great City Pump Stations," *The Times-Picayune*, October 1, 1916

<sup>52</sup> *The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925*. Victory Printing Co.

underneath the roads and could be as large as 25 feet wide and 9 feet deep.<sup>53</sup> To bring the water to the pumps, the system relied on lower lift pumps, also invented by Wood.<sup>54</sup> Unlike the screw pumps at the stations, the lower lift pumps were responsible for bringing the water to the pumping stations. According to a 1925 report by the Sewerage and Water Board of New Orleans, "...the City [New Orleans] has probably the greatest aggregation of low lift pumps that has ever been assembled within an equal area anywhere."<sup>55</sup> The city could back up this claim given that the low lift had the capacity to pump 80,000,000 gallons per day.<sup>56</sup>

The drainage system expanded to deal with removing sewerage and bring clean water to the city's residents. The sewerage mixed with water for easy flowing through the sewerage pumps. However, the trash and debris clogged the pumps. Wood acknowledged the problem and devised a solution. Wood filed a patent application with the United States Patent Office on September 10, 1915 for a centrifugal pump. (Figure 3).

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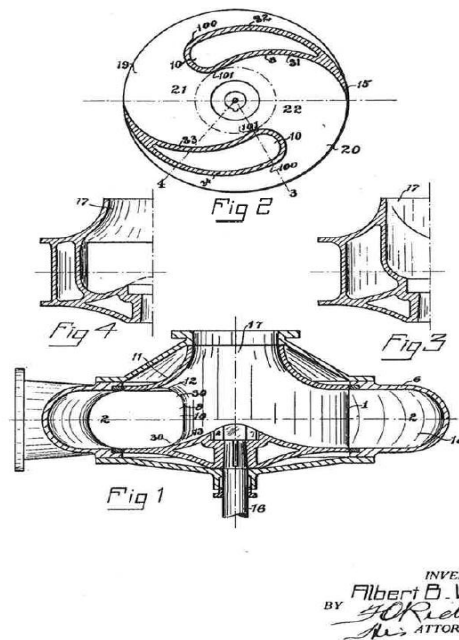
<sup>53</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>54</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>55</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>56</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.





**Figure 3:** Patent and Trademark Office. <http://www.pat2pdf.org/patents/pat1182439.pdf> (accessed September 2, 2009) patent 1,182,439.

In his patent application, Wood explained the significance of his improvement on the centrifugal pump by writing “these objects frequently lodge in the pump, sometimes placing it out of service entirely, and at lease greatly reducing its efficiency. Indeed, sometimes the nature of the foreign substances lodging in the pump may be such as to cause its injury or destruction.”<sup>57</sup> To prevent this from happening and protect the pumps, Wood stated that

Another object of my invention is to provide a pump of this nature which can accomplish the foregoing objects, and which is provided with vanes taking up little or none of the circumference of the impeller, thereby enabling me to discharge the water uniformly over the entire periphery of the impeller, thereby

<sup>57</sup> U.S. Patent and Trademark Office, Download U.S. Patents and more. <http://www.pat2pdf.org/patents/pat1182439.pdf> (accessed September 2, 2009)

avoiding the creation of eddies in the volute and the consequent loss of efficiency.<sup>58</sup>

Wood's centrifugal pumps, according to *The Times-Picayune*, "...were specially designed by Engineer Wood to meet a difficult problem on which the board has been working [on for] some time..."<sup>59</sup> Wood designed the pumps so that even large pieces of debris could be separated from the water without clogging the pumps.<sup>60</sup> Even though the sewerage pumps could pass large items through without damage to the pump, *The Times-Picayune* urged residents to use caution about what got sent through the pumps, saying "of course, this does not mean that persons can throw anything into the sewers, for there is still the great danger of the obstacle clogging the pipes before it reaches the pumps."<sup>61</sup> The water and sewerage would be separated and the sewerage sent to the Mississippi River, where, according to the Sewerage and Water Board, "...it is at once mixed with so vast a volume of muddy water that it never even appears at the surface, and no test further downstream has yet been able to indicate its presence."<sup>62</sup>

The disposal of raw sewerage *into* the Mississippi River was considered acceptable as long as no one could see the sewerage in the river. However, at this time, water drawn *from* the Mississippi River was being passed through a water purification system before reaching the city's residents. In 1925, the Sewerage and Water Board explained its acceptance and excitement over the purification system, which had in some version already been in place by the early 1900s. The updated purification practice "affords a limitless quantity of a most desirable character of

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<sup>58</sup>U.S. Patent and Trademark Office, Download U.S. Patents and more.  
<http://www.pat2pdf.org/patents/pat1182439.pdf> (accessed September 2, 2009)

<sup>59</sup> "City's New Pumping Station Begins Duty," *The Times-Picayune*. February 2, 1917.

<sup>60</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>61</sup> "City's new Pumping Station Begins Duty," *The Times-Picayune*. February 2, 1917.

<sup>62</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

water, showing practically no evidence of the pollution which enters it from every city in the valley.”<sup>63</sup>

Ironically, at the end of the 1880s, city officials had been appalled by the dirty state of the Mississippi River, they now celebrated its “usefulness” in making the waste of the city magically disappear. Since New Orleans residents were drinking purified water, dumping into the Mississippi River was no longer considered an issue, especially since no visible damage of this practice could be seen by visitors, residents, and officials.

In 1913, *The Daily Picayune* praised the city for its progressive response to the problem, “No other influence is so vital in its relation to the health of a community as the water supply and the efficiency with which this supply is regulated is a very good index to the progressiveness of a municipality.”<sup>64</sup> Wood was in charge of the purification plant. By adding lime and sulphate of iron, the water became softer allowing the dirt to clump together and settle to the bottom, which allowed for clean drinking water on top.<sup>65</sup> The water was then transported to residents and dispensed through faucets. The water delivered to the residents contained “no pathogenic or disease forms whatsoever, and carries only 1 1/3 percent of the bacteria that it carried when it left the river”<sup>66</sup> Now if a resident’s faucet produced dirty water, according to *The Daily Picayune*, the problem was not because of the purification system because “that was not its condition when it left the head house...[because]...whenever a water main is disturbed for repairs this sediment is stirred into action and the result may be muddy water through your faucet. But it is not the fault

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<sup>63</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>64</sup> “The Best Water in the World: Model Pumping Station Which Supplies New Orleans With Nearly Twenty Million Gallons of Purified Water Every Day.” *The Daily Picayune*, May 25, 1913.

<sup>65</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>66</sup> “The Best Water in the World,” *The Daily Picayune*, May 25, 1913.

of the purification system.”<sup>67</sup> By the end of 1899, unscreened cisterns in the city numbered 67,000, and by 1925, the number went to zero.<sup>68</sup> While some people continued to use cisterns, it is estimated that there were only about 3,000 *covered* cisterns in New Orleans during the twenties.<sup>69</sup> (Figure 4).

	End of 1899	End of 1905	End of 1925	End of 1934
Approximate number of Premises in City	67,000	75,000	103,000	125,000
Number of Premises connected to sewers	0	0	96,000	110,254
Premises having screen cisterns	0	0	3,000 est.	N/A
Number of Sewerage Pumping Stations	0	N/A	10	15
Area Drained in Acres	13,000	N/A	40,000	50,000
C. F. per second drainage Pumping Capacity	1,200	5,000	13,000	25,478

**Figure 4:** The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1935. Published by The Sewerage and Water Board.

## New Orleans’ Changing Landscape

With the installation of the pumps, New Orleans officials were now equipped to carry out plans they had hoped to achieve before Wood designed the screw pumps. The plan was called land reclamation, and consciously devised as a way to increase the city’s size. With this in mind,

<sup>67</sup> “The Best Water in the World,” *The Daily Picayune*, May 25, 1913.

<sup>68</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

<sup>69</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

in 1913, the Louisiana Constitution, Section 3 of Article 281 granted permission for individuals to own land that “must be leveed and pumped in order to be drained” as long as the Board of Drainage Commissioners had “not less than a majority in acreage of the property taxpayers, resident and non-resident, in the area to be affected.”<sup>70</sup> Eventually, in 1921, the Louisiana Constitution granted Louisiana’s government permission “to enact necessary legislation for the purpose of causing to be drained and reclaimed the undrained marsh, swamp, and overflowed lands in the State.”<sup>71</sup>

*The Times-Picayune* explained that “as New Orleans grew and spread its borders...the reclamation work was extended in keeping with its growth; until at last came the crowning work which gave to this city its splendid drainage; which lowered the water-level several feet; and established huge pumping stations...”<sup>72</sup> Without the screw pump, land reclamation could not have been possible. Some parts of the marsh land were purposely left undrained to show the residents before and after visuals

Today there are still a hundred acres of original swamp on the property, and this has been preserved to show the miracle made possible by pumping and draining the flooded lands of the delta. This land is covered with trees and the water extends far up their trunks. The remainder of the tract is as dry as a bone. The water, the marsh and the trees have all disappeared<sup>73</sup>

The open land seemed lucrative to real estate men, who were “interested in this great transaction because it will finally remove all the wet land from the city...and they predict that the

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<sup>70</sup> Huey P. Long. *Constitutions of the State of Louisiana: Text of constitution adopted June 18, 1921, with text of corresponding articles in all of the constitutions of the state, including all amendments.* (Baton Rouge, Ramires-Jones Printing Co. , 1930), 504.

<sup>71</sup> Huey P. Long. *Constitutions of the State of Louisiana*, 504.

<sup>72</sup> “Prairie Marsh Transformed as If by Magic Into Fields of Grain and Orchards of Unrivalled Citrus Fruits,” *The Times-Picayune*, June 13, 1915.

<sup>73</sup> Frank G. Carpenter, “Millions of Acres of Rich Food Lands to Be Reclaimed: Frank G. Carpenter Visits Louisiana Reclamation Areas and Foresees in This Territory ‘Uncle Sam’s New Bread Basket’—Wonderful Wealthy of Alluvial Regions of the Lower Mississippi—The River as an Earthy Robber,” *The Times-Picayune*, May 27, 1917.

whole tract will build up within a few years.”<sup>74</sup> In 1916, T. B. Bird took advantage of land reclamation and bought 550 acres of marsh land for \$742,000 in an area located above the New Basin canal known as West End, which is still a residential area today.

The particular historical moment in which the screw pumps appeared led to this progressive infrastructure unwittingly colluding with strategies of racial segregation. While customary segregation had flared up after the Civil War, the enactment of Jim Crow laws in the late 1870s segregated public facilities with “separate but equal” accommodations. More often than not, the accommodations were far from equal. While Jim Crow laws varied from state to state, overall the laws toppled the equality initiatives Reconstruction brought to the South and created a color line designed to be impenetrable. In the 1896 Supreme Court case of *Plessy v. Ferguson*, the court upheld the notion of “separate but equal,” which ultimately insured substandard (and hence unequal) public accommodations for African-Americans in the South.<sup>75</sup>

Segregation also occurred in neighborhoods. To discourage interracial interaction, the Louisiana Legislature enacted Act 117 of the 1912 Louisiana Constitution, which prevented not only blacks from building or living in white neighborhoods, but also blocked whites from doing the same in black neighborhoods.<sup>76</sup> Section 1 outlawed the granting of building permits to blacks or whites who wished to build a house in a neighborhood that consisted of a majority of residents from a different race.<sup>77</sup> Section 3 of Act 117 imposed a fine of at least fifty dollars on

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<sup>74</sup> “Deal at West End Means Big Things, Removing Marsh Tract Bought for \$750,000 Will Be Made Into Modern City Section,” *Times Picayune* May 21, 1916.

<sup>75</sup> “...in denying the complaint of a southern Negro, Homer Adolph Plessy, it sanctioned the fallacious doctrine of ‘separate but equal’ and thus invited the pervasive spread of legally imposed Jim Crow.” Otto H. Olsen, *The Thin Disguise: Turning Point in Negro History, Plessy v. Ferguson*, (New York: Humanities Press, 1967), 1. For more information on Jim Crow, please see C. Vann Woodward, *The Strange Career of Jim Crow*, (New York: Oxford University Press, 1955).

<sup>76</sup> *Constitutions and Statues of Louisiana The Constitution with all amends to January 1920. Compiled and annotated by Solomon Wolff. Volume 11. (Indianapolis: The Bobbs-Merrill Company, 1920), 1358.*

<sup>77</sup> *Constitutions and Statues of Louisiana, 1358-1359*

any business or individual that granted building permits for such clients.<sup>78</sup> Section 2 highlights the fact that during this time black and white neighborhoods were customarily defined by the residents, not by law. Section 2 stated that “...the terms ‘white community’ and ‘negro community’ as used in this act shall be taken and held to mean any subdivision or portion thereof or any street which is inhabited principally by white people or negroes as the case may be.”<sup>79</sup> While the law might have discouraged racially integrated neighborhoods, the law never explicitly listed which areas were black or white only and left the labeling of neighborhoods to the discretion of the residents.

By the time Wood patented the screw pump, the practice of neighborhood segregation already existed. Scholar Peirce F. Lewis claims that “the Wood pump, as it turned out, was a powerful agent to accelerate residential segregation in New Orleans.”<sup>80</sup> While the practice of residential segregation was in place before the installation of the pumps, installing the pumps did not help the situation. However, in order to have the system work, it needed to be comprehensive, meaning the system could not function if certain areas were excluded so both black and white sections began to undergo installation of the pumps. By draining lands that at one time were uninhabitable, the pumps now presented New Orleans with land suitable for residential use. As seen in Figure 4, from the turn of the century to 1925, the pumps drained 27,000 acres of land.

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<sup>78</sup> Constitutions and Statues of Louisiana, 1359.

<sup>79</sup> Constitutions and Statues of Louisiana, 1359.

<sup>80</sup> Peirce F. Lewis, *New Orleans—The Making of an Urban Landscape*, (Cambridge Massachusetts: Ballinger Publishing Co., 1976), 57.

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**Figure 4:** The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1935. Published by The Sewerage and Water Board.

The screw pump had the power to drain thousands of acres in a short span of time so now New Orleans had an abundance of land suitable for building residential neighborhoods and businesses. Because of this opened land, building permits granted skyrocketed. For comparison, in 1918, only 552 building permits had been issued, but in 1923, an astonishing 3,049 building permits were granted.<sup>81</sup> When the drainage acts of 1910 were first enacted, the screw pump had not been invented and the officials planned to use the inefficient pumps that preceded the screw pump. Had those pumps been used to drain the land, the process would have happened at a slower pace and so would residential segregation. While neighborhoods would have still been

<sup>81</sup> Soard's New Orleans City Directory 1925. (New Orleans: Soard's Directory Co. Ltd, 1925), 23. The rapid increase in building permits can also be attributed to the end of World War I in 1918 and the housing boom that followed. However, without the open land from the screw pumps, the returning soldiers would have had as many opportunities to apply for building permits.



developed along racial lines, the progression of this neighborhood pattern would have been more gradual. However, Wood's pumps had been used and, therefore, the screw pump *did* accelerate residential segregation.

An example of how newly drained land was segregated can be seen in the development of the Gentilly Terrace neighborhood. The Gentilly Terrace Company purchased enough land to cover about fifty city blocks and provided 3,800 lots available for residential housing.<sup>82</sup> The Gentilly Terrace Company published pamphlets that advertised for the wonders of living in the neighborhood as well as restrictions that all purchasers must obey. Included in the pamphlet was a color line clause, which stated that "each purchaser binds himself and his heirs and assigns to never lease or sell to a negro or negroes."<sup>83</sup>

The practice of residential segregation in New Orleans was not pronounced as it was in other parts of the country. By 1910, significant numbers of African-Americans had migrated out of Southern cities and rural areas, part of the Great Migration. While African-Americans looked to Northern cities for a new start, they often found the racial environment there as hostile as in the South. Northern cities began segregating schools, public facilities became segregated, and state legislators advocated for the return of miscegenation laws.<sup>84</sup> African-Americans soon realized that life differed slightly in the North than in the South. The view from a southern migrant to the North expressed that "the white man of the North is of the same race as the white man of the South and that in his blood is the virus of domination and power."<sup>85</sup> The practice of residential segregation in New Orleans was not as pronounced as it was in other parts of the

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<sup>82</sup> Dorian Hasting, "Early Neighborhood Development in New Orleans: Neither New South Nor Old" University of New Orleans Midlo Center 2004, 31

<sup>83</sup> Figure 4.2 found in Dorian Hasting, "Early Neighborhood Development in New Orleans: Neither New South Nor Old" University of New Orleans Midlo Center 2004, 32.

<sup>84</sup> Michael J. Klarman, *From Jim Crow to Civil Rights: The Supreme Court and the Struggle for Racial Equality*, (New York: Oxford University Press, 2004), 63.

<sup>85</sup> As quoted in Michael J. Klarman, *From Jim Crow to Civil Rights: The Supreme Court and the Struggle for Racial Equality*, (New York: Oxford University Press, 2004), 63.

country. Even though the screw pump accelerated the rate to which residential segregation occurred, the pumps did not create physical barriers to prevent black and white interactions. In fact, according to Lewis,

If American had to have racial segregation, the New Orleans pattern [of neighborhoods] was less malevolent than that of most Northern cities. Neither whites nor blacks were very far from persons of the other race, and, since each group knew their respective neighborhood to be geographically stable, neither felt particularly threatened by the other.<sup>86</sup>

The lack of physical barriers allowed for this closeness between the races. While the drains had changed the *social* landscape of New Orleans, the urban *built* landscape of existing structures had changed little. In addition, other than the pumping stations, which were located throughout the city, the drainage system did not substantially change the architecture or skyline of the city, which prohibited some from seeing New Orleans as a modernized city. In contrast, New York City's use of elevators to create skyscrapers created a visual of modernization, meaning people could look and actually see ongoing changes in the city for themselves.

In contrast, New York City had to completely dismantle the city to create skyscrapers. The construction of the skyscrapers in New York provided visual evidence to New Yorkers of a constantly changing, modernizing city. For example, in New York, the Gillender Building, built in 1897, was torn down to build a much taller building. In comparison, New Orleans' buildings and architecture did not suffer from the installations of the pumps. At first, people were amazed to have water-free streets during rainstorms. However, after a while, this accomplishment became an expected part of daily life and residents began taking this for granted. Once the drainage system was complete, New Orleans residents no longer saw daily construction work and no further construction work was needed other than maintaining the pumping stations.

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<sup>86</sup> Lewis, *New Orleans—The Making of an Urban Landscape*, 61-62.

## Legacy and Limitations of the pumps

As soon as the screw pumps were installed and running, Wood's engineering gained an international reputation. The Dutch government approached Wood about using his screw pump to help drain the Netherlands. To successfully drain the Zuyder Zee, the Netherlands needed the most modern and efficient system possible. Dutch officials tried to organize a meeting with Wood at the wishes of the Queen of Holland. However, in dealing with Wood, the Dutch ran into one problem; Wood refused to leave Louisiana. Wood requested Dutch officials and engineers to come to New Orleans to see firsthand how the screw pumps worked in action. However, the trip would have to wait until Wood came back from a fishing trip. According to a *New Orleans States* newspaper article, a Dutch engineer spokesman pleaded with Wood to visit Holland reasoning that the trip was ““for her majesty the queen (sic) of Holland. Her majesty's government wants you to supply pumps for Holland.”” Wood simply responded, ““Yes, I understand. I'll be back Tuesday...but now—now, I'm going fishing.””<sup>87</sup>

Eventually, Dutch engineers traveled to New Orleans to view the screw pumps. On December 14, 1916, Wood granted the blueprints and manufacture rights for his screw pumps to the Werkspoor Company. However, the engineers at Werkspoor Company encountered problems during the construction of the screw pumps. Again, Wood refused to travel to the Netherlands. The engineers came to New Orleans, for the second time, where Wood easily pointed out the engineers' errors. After the screw pumps were installed, the pumps successfully cleared the Zuyder Zee, an area about the size of Rhode Island creating a living space for 300,000 people.<sup>88</sup>

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<sup>87</sup> Pie Dufour, “Dutch Wanted to Buy Some Pumps But Baldwin Wood Went Fishing,” *New Orleans States*, May 5, 1956.

<sup>88</sup> The American Society of Mechanical Engineers, *A National Historic Mechanical Engineer Landmark: The A. B. Wood Low Head High Volume Screw Pump*, (Sewerage and Water Board of New Orleans, 1974), 11.

The incident with the Dutch government was not the only time Wood refused to travel outside of New Orleans. Other cities and countries, such as Chicago, Illinois, and Great Britain unsuccessfully offered him huge sums of money to leave. While he served as consultants for different places, he never physically committed himself to any other city. While he required other cities to pay royalties for his pumps, he never once required New Orleans to follow this rule.

## **Conclusion**

Wood changed New Orleans with one single invention. The screw pump dried up New Orleans and cleaned up the city's water supply. Wood had no motive for his invention other than to improve the city's drainage. Thanks to Wood and his pump, New Orleans became a model of modernization during the early twentieth century. Wood's imprint on New Orleans remains fresh, even into the twenty-first century. In 2005, the flooding and levee failure experienced in New Orleans caused by Hurricane Katrina brought Wood and his inventions to the fore. While Wood's screw pumps held up during Hurricane Katrina, a levee breach that flooded the lower Ninth Ward of New Orleans turned the nation's attention to the "inadequate" drainage of New Orleans prompting Governor Kathleen Blanco to travel to the Netherlands to view their levee pumping stations. If the pumps are as powerful as Wood claimed, then why did and does New Orleans still flood? Wood designed the screw pumps for daily, average rainfall and not for a sudden water surge on the city. In the case of Hurricane Katrina, New Orleans flooded not because of the failure of the drains but because of the failure of the levees!

If Wood could choose, he would probably fade into the history books and let his pumps demonstrate their efficiency, and in the work the pumps do for New Orleans everyday, the pumps do, in fact, tell their own story. For example, a 1915 *Times-Picayune* article called the

phenomenon of land reclamation “magic” and credits the screw-pump as the magician; “...the true worker of magic is the great machine that digs the canals and drains the marshes...this is one of the reasons that land reclamation is destined to develop the port of New Orleans as it has never been developed before.”<sup>89</sup>

Daily life changed remarkably once the drainage system was complete: stagnant water no longer stood in the street, New Orleans was free of epidemics, rainwater was removed faster from the streets, and uninhabitable land opened for the first time. According to Lewis, the pumps “...revolutionized the urban geography of New Orleans by suddenly opening to settlement areas which were thought forever close.”<sup>90</sup> For example, in 1899, 13,000 acres had been drained, but by 1925 an astonishing the total reached 40,000. These additional acres increased the size of the New Orleans as well as the city’s racial division. (Figure 4).

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<sup>89</sup> “Prairie Marsh Transformed as If by Magic Into Fields of Grain,” *The Times-Picayune*, June 13, 1915.

<sup>90</sup> Lewis, *New Orleans—The Making of an Urban Landscape*, 61-62.

	End of 1899	End of 1905	End of 1925	End of 1934
Approximate number of Premises in City	67,000	75,000	103,000	125,000
Number of Premises connected to sewers	0	0	96,000	110,254
Premises having screen cisterns	0	0	3,000 est.	N/A
Number of Sewerage Pumping Stations	0	N/A	10	15
Area Drained in Acres	13,000	N/A	40,000	50,000
C. F. per second drainage Pumping Capacity	1,200	5,000	13,000	25,478

**Figure 4:** The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1935. Published by The Sewerage and Water Board.

Yellow fever, which at points in the city’s history had turned New Orleans into a dead man’s zone, had completely vanished. New Orleans residents enjoyed clean water (at least considered clean for that time) and flood-free streets. *The Daily Picayune* reminded New Orleans residents that “...the next time that you take a drink of water you are not only quenching your thirst, but you are drinking the best water in the world.”<sup>91</sup>

All these tiny steps led to Albert Baldwin Wood’s understanding of what the public needed for drainage. Wood, being a mechanical engineer, possessed the expertise sought after in the Progressive era, though his personality did not match that of the typical Progressivism politician. His position as an engineer with the Sewerage and Water Board led to confidence in

<sup>91</sup> “The Best Water in the World: Model Pumping Station Which Supplies New Orleans With Nearly Twenty Million Gallons of Purified Water Every Day.” *The Daily Picayune*, May 25, 1913.

him by Progressive era city officials since his credentials assured them that a leading authority was in charge of the system. At the same time, Wood, an Uptown reformer, lived a quiet life and wished for no publicity. It was his pumps, not his personality, that carried out the Progressive ideals. These factors, aligned with Wood's engineering talent, paved the way for the successful implementation of the plan. The "trust in experts" idea was greatly exploited through newspapers that praised Wood and the pumps directly rather than the Sewerage and Water Board as a whole, who workers were doing the actual physical work of laying down the lines.

By the 1910s, New Orleans was headed toward modernity. The city began installing the screw pumps, ran a purification system, and removed sewerage from the city, all thanks to Wood's expertise. Achieving Southern urban progressive goals, the progress of New Orleans can best be summed up by the Sewerage and Water Board that "malaria and yellow fever have disappeared and typhoid has been reduced to the limit which an entirely safe water supply and adequate sewerage facilities can reduce it, and the general conditions of healthfulness and comfort, convenience and efficiency of life have been correspondingly improved."<sup>92</sup>

The rate at which New Orleans achieved these goals was accelerated by the installation of the screw pumps. While the city had for decades tried to solve its drainage problem, Wood designed, implemented and made significant changes to the city in only a matter of a few years. Without Wood and the screw pump, the city would have progressed at a much slower rate. With all the improvements the pumps created for the city of New Orleans, it is hard to disagree when the *Times-Picayune* summed up Wood's and the pumps achievements by proclaiming "those

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<sup>92</sup> The Waterworks, Sewerage, and Drainage Systems of the City of New Orleans, Louisiana 1925. Victory Printing Co.

great Wood pumps are wonderworkers, and this city has added enormously to her prosperity by acquiring them.”<sup>93</sup>

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<sup>93</sup> “Story of Great City Pump Stations.” *The Times-Picayune*, October 1, 1916



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## **Vita**

Nicole Romagossa was born in New Orleans, Louisiana, but spent most of her childhood growing up in Slidell, Louisiana. In 2008, Romagossa received her Bachelor of Arts at Louisiana State University. Immediately following LSU, Romagossa was accepted as a candidate for a Master's of Arts in History with a Public History Concentration at the University of New Orleans. Romagossa is currently employed at The National World War II Museum as an assistant to the Vice President/Chief Operating Office. In her spare time, Romagossa likes to spend time with family and friends.